

# Ion Exchange in the **Mining Industry**







Acidic wastewater from mining operations, known as acid mine drainage (AMD), requires treatment prior to discharge in order to prevent adverse impacts to downstream receiving waters such as rivers, lakes and streams.



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# Introduction



Mining ores and metals from the Earth has occurred since the earliest recorded history. Mining has become one of the most critical industries in the world, especially now with the growth of electronics. The purification process of extracted minerals has evolved over time, and many of these processes require ion exchange technology. ResinTech provides products to assist the purification process with line of selective ion exchange resins, known as the SIR series.

ResinTech's SIR line includes the most advanced and efficient selective ion exchangers in the market, as well as resins and specialty media for the treatment and removal of contaminants from mining waste streams.



# Applications

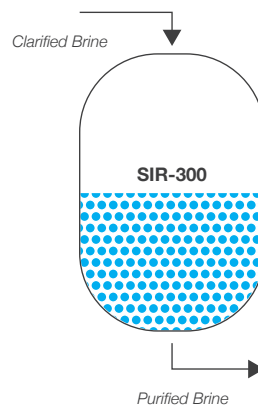
## BRINE DECATIONIZATION

Mineral salt brine streams are often contaminated with trace metals and other pollutants. Some are common ions, such as calcium, magnesium, and iron, while others are less common, such as aluminum and vanadium. ResinTech's specialty chelating resins efficiently remove hardness ions from brine streams without being exhausted by sodium, and the treatment options can be adjusted depending on the application.

ResinTech **SIR-300** is a weak acid cation resin with a unique iminodiacetic chelating functionality that removes divalent transition metals preferentially to alkaline earth metals such as calcium. SIR-300 is intended for the removal of low to moderate concentrations of heavy metals from waste streams.



### Brine Decationization:



Product Name	Resin Type	Form	Water Retention	Total Capacity	Advantages
<b>SIR-300</b>	PS/DVB/Gel	H	50 - 60%	1.40 eq/l	Very high mechanical & chemical resistance

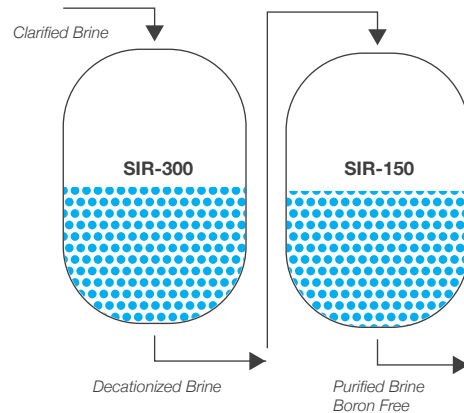
## BRINE BORON REMOVAL

Boron is one of a number of elements present in natural salt mine brines from which lithium is extracted. Although the element has wide industrial application, boron impurities can accumulate carbonate and impede the productivity of lithium energy products.

ResinTech **SIR-150** is a borate selective weak base anion resin with a unique functionality providing exceedingly high selectivity for boron in almost any aqueous solution. When exhausted, it can be regenerated with acid and then neutralized with various alkaline salts for hundreds of service cycles. SIR-150 is intended for all borate removal applications including potable water, ultrapure water, and boron removal from concentrated lithium chloride brines.



### Boron Removal:



Product Name	Resin Type	Form	Water Retention	Total Capacity	Advantages
<b>SIR-150</b>	PS/DVB/Macroporous	Cl	46 - 60%	0.8 eq/l	Highest exchange & kinetical capacity



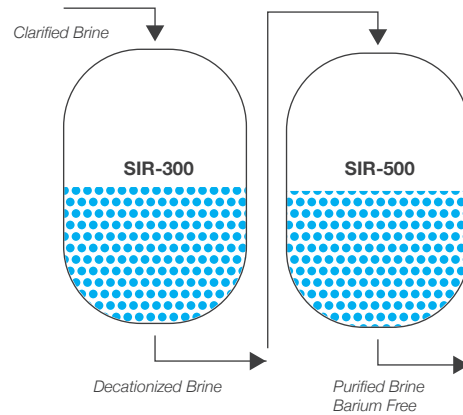
## BRINE BARIUM REMOVAL

Barium is among the impurities affecting mineral salts brines and can be very difficult to remove. ResinTech has developed a highly efficient selective ion exchange resin capable of removing barium from mineral salt brines.

ResinTech **SIR-500** is a weak acid cation resin with a unique aminophosphonic chelating functionality and is particularly selective for alkaline earth metals such as barium and calcium. SIR-500 is intended for removal of hardness and barium from saturated brine and for removal of divalent metals such as copper and nickel from wastewater and various process streams.



### Barium Removal:



Product Name	Resin Type	Form	Water Retention	Total Capacity	Advantages
<b>SIR-500</b>	PS/DVB/Macroporous	Cl	50 - 70%	1.70 eq/l	Very high mechanical & chemical resistance

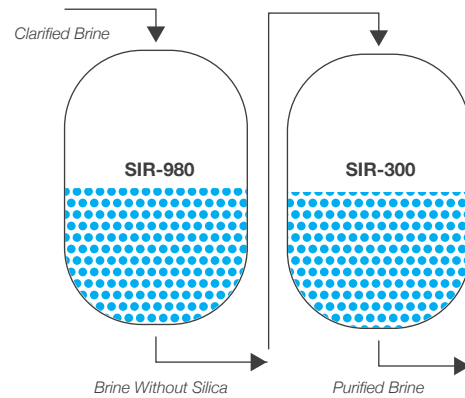
## BRINE SILICA REMOVAL

Silica is a problematic impurity present in some mineral salts, making brine purification very difficult. ResinTech has developed a new line of hybrid ion exchangers that allow silica removal from highly concentrated brines with no silica dumping when the resin become saturated.

ResinTech **SIR-946** and ResinTech **SIR-980** are a state-of-the-art hybrid media, designed to work in a wide range of pH and brine concentrations for selective silica removal.



### Silica Removal:



Product Name	Resin Type	Form	Water Retention	Total Capacity	Advantages
<b>SIR-946</b>	PS/DVB/Macroporous	Cl	48 - 60%	1.40 eq/l	High exchange and kinetic capacity
<b>SIR-980</b>	PS/DVB/Macroporous	Cl	52 - 63%	1.40 eq/l	High exchange and kinetic capacity



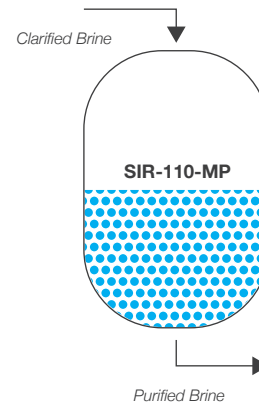
## BRINE PERCHLORATE REMOVAL

Perchlorate is an emerging contaminant found in some water sources due to the use of road flares, rocket fuel, explosives and some fertilizers. Perchlorates are also found in nature and as a result can be found in highly concentrated brines.

ResinTech has developed a new ion exchange resin capable of efficiently removing perchlorate present in highly concentrated brines during the purification process, and in some cases the perchlorate can be recovered. ResinTech **SIR-110-MP-HP** is a strong base macroporous anion exchange resin able to work within a wide range of pH in highly concentrated brines.



### Perchlorate Removal:



Product Name	Resin Type	Form	Water Retention	Total Capacity	Advantages
<b>SIR-110-MP-HP</b>	PS/DVB/Macroporous	Cl	50 - 62%	0.80 eq/l	Very high mechanical & chemical resistance





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## Industry-leading Technical Support

Our legendary technical support team combines the world's leading IX scientists, most sophisticated laboratory, and advanced ion exchange simulation technology to solve the most challenging water quality dilemmas. We can conduct a detailed analysis of your influent or effluent, model your application's environment in a "virtual" setting, and provide product or process recommendations to ensure optimal water treatment operations for virtually any case. Reach out to us for help at [techsupport@resintech.com](mailto:techsupport@resintech.com) or scan the QR code below.

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